WHAT IS CLAIMED IS:

1. A chemical analyzer, comprising:

a flow restrictor receiving a circulating liquid flow comprising a sulfur concentration and having a flow restrictor outlet providing a liquid sample flow that is a portion of the circulating liquid flow;

a vaporizer receiving the liquid sample flow, the vaporizer providing a vaporized sample flow that includes a portion of the liquid sample flow;

a combustion chamber receiving the vaporized sample flow and receiving supplies of air and a fuel gas, the combustion chamber providing a combustion exhaust gas in which the sulfur concentration is combusted to sulfur dioxide;

a pump receiving the combustion exhaust gas at an inlet pressure and providing pressurized combustion exhaust gas at a pressure that is higher than the inlet pressure; and

a flame photometric detector receiving the pressurized combustion exhaust gas and providing a chemical analysis output indicative of the sulfur concentration in the circulating liquid flow.

2. The chemical analyzer of Claim 1 further comprising a cooler coupled to the flow restrictor.

3. The chemical analyzer of Claim 1 wherein the flow restrictor comprises a membrane bypass filter.

4. The chemical analyzer of Claim 3 wherein the membrane bypass filter has a pore size of about 1 micron.

5. The chemical analyzer of Claim 1 wherein the vaporizer comprises a vaporizing liquid injection valve.

6. The chemical analyzer of Claim 5 wherein the vaporizing liquid injection valve comprises a dual zone vaporizing liquid injection valve.

7. The chemical analyzer of Claim 1 further comprising a back pressure and flow regulation system coupled to the combustion chamber.

8. The chemical analyzer of Claim 1 wherein the combustion chamber comprises a flame ionization detector.

9. The chemical analyzer of Claim 1 wherein the pump comprises a jet pump.

10. The chemical analyzer of Claim 1 further comprising an RSH permeation device coupled to the flame photometric detector.

11. The chemical analyzer of Claim 1 further comprising an oven enclosing the vaporizer and the flame photometric detector.

12. The chemical analyzer of Claim 11 wherein the oven maintains a temperature of about 225 degrees Centigrade.

13. The chemical analyzer of Claim 1 further comprising a flow controller controlling flow of a pressurized gas to the chemical analyzer.

14. The chemical analyzer of Claim 13 further comprising a controller controlling delivery of the pressurized gas to the chemical analyzer.

15. The chemical analyzer of Claim 1 further comprising a controller calculating the chemical analysis output based on calibration data stored in the controller.

16. The chemical analyzer of Claim 1 wherein the circulating liquid flow comprises gasoline and the sulfur concentration in the gasoline is less than 500 ppm.

17. A method of measuring a sulfur concentration in gasoline, comprising:

receiving a circulating liquid flow of gasoline comprising a sulfur concentration;

sampling the circulating liquid flow of gasoline to provide a liquid sample flow;

vaporizing at least a portion of the liquid sample flow to provide a vaporized sample flow that includes a portion of the liquid sample flow;

combusting at least a portion of the vaporized sample flow to provide a combustion exhaust gas in which the sulfur concentration is combusted to sulfur dioxide;

pressurizing at least a portion of the combustion exhaust gas to a higher pressure;

detecting the sulfur dioxide in the pressurized combustion exhaust gas using a flame photometric detector; and

calculating an output representative of the sulfur concentration based on the sulfur dioxide detecting.

18. The method of Claim 17, further comprising cooling the circulating liquid flow before the sampling.

19. The method of Claim 17 and further providing an oven to maintain temperatures of the liquid sample flow, the vaporized sample flow and the combustion exhaust at a preselected temperature.

20. The method of Claim 17, further comprising controlling the vaporizing, combusting and detecting with a controller.